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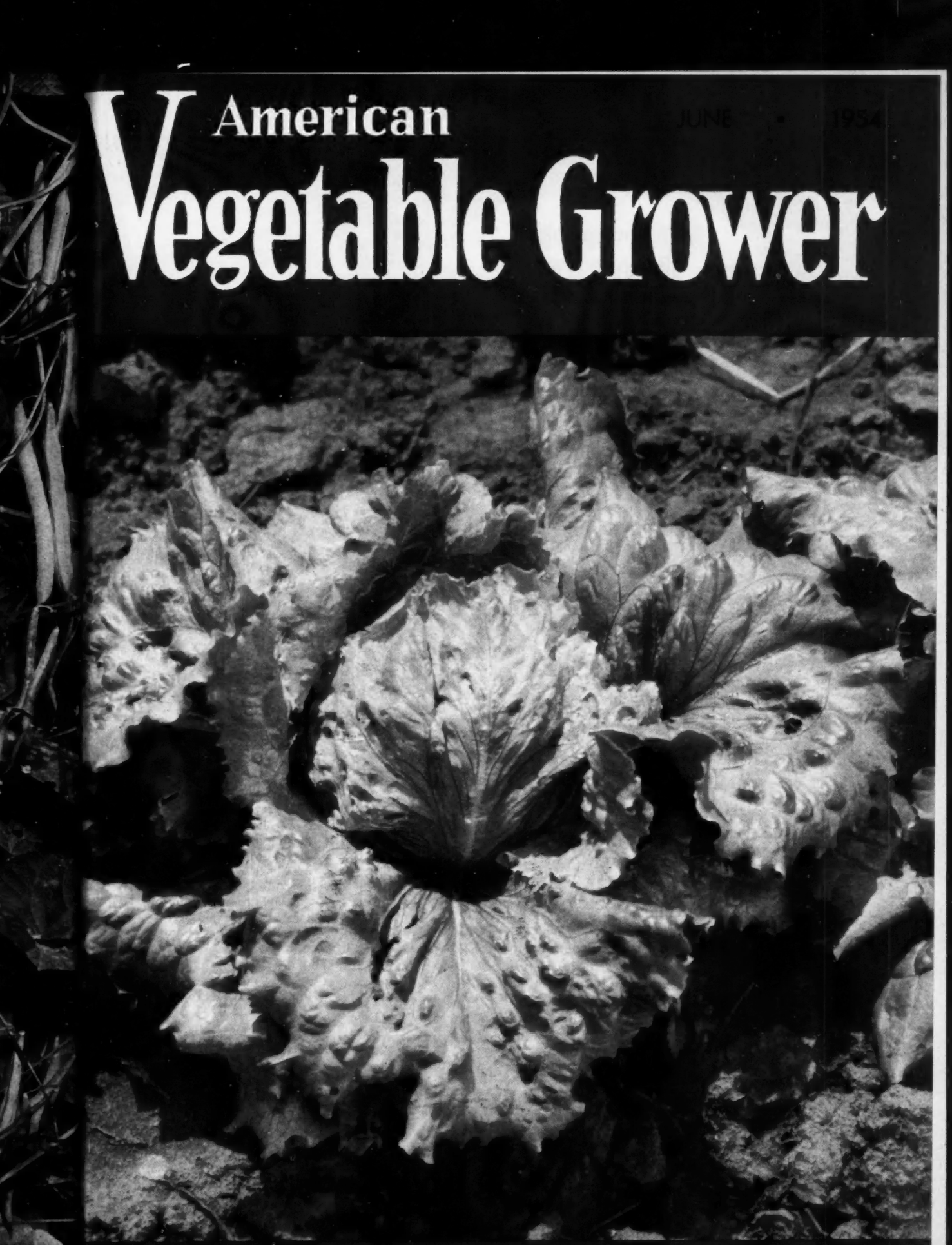
American Vegetable Grower



IRRIGATE TO MAKE — NOT JUST TO SAVE — YOUR CROP

American
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Vol. 2 June, 1954 No. 6

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LETTERS TO THE EDITOR

How I Irrigate My Vegetables

Dear Editor:

I read in the last issue of AMERICAN VEGETABLE GROWER that you were planning to feature several articles on irrigation. This prompted me to write you about my experiences.

Most irrigators in southern New Jersey use lightweight portable pipes and rotating sprinklers to distribute water in their fields. There are growers, also, who are using plastic irrigation systems which can be readily installed by one man.

Vegetable growers have asked me when they should irrigate their crops. I have found that the first application of water should be made when about 50 per cent of the available soil moisture is used up—and don't use the soil surface as a guide! Dig down four or five inches, and if you find that the soil at that depth will just ball in your hand it indicates that about 50 per cent of the available moisture is gone. Experience has shown me that the best time to examine the soil is shortly after the crops have been planted. Often seeds are placed in loose, dry soil not containing enough moisture for proper germination. This results in a poor stand.

I have never delayed irrigating because I thought it might rain. I have found that more damage is likely to occur if I have waited too long to irrigate than if irrigation is followed closely by a rain.

Another question asked me is, "When is the best time of day to irrigate and at what stage of crop growth will irrigation be most beneficial?" My experience is that either day or night irrigation is about equally satisfactory if done in the right way. A little more water is lost by evaporation during the day time. One thing to remember—when it is a hot, sunny day, damage to tomatoes from scalding may occur from daytime irrigation.

The stage of plant growth varies with different crops. Beans and peas need the most water during the late bloom and early pod stage. For corn, it is best to irrigate after the shoots begin to form.

An irrigation system should take into account the rate at which water can be applied to the soil. It should not be done so fast that there is a large amount of runoff. A good, clean cultivated sandy loam soil will seldom absorb water faster than one-half inch per hour. But the same soil, when covered with grass, will take over an inch of water in a half hour.

Hammonton, N. J. James Shoemaker

"Rarin' to Go"

Dear Editor:

Just a note to let you know I was greatly impressed with the article on our "younger generation" of vegetable growers in one of your recent issues. They certainly are "rarin' to go!"

Wenatchee, Wash. W. R. Smith

"Cover Crops Are Fertilizer Factories"

Dear Editor:

Congratulations on a very fine article in your April issue—"Cover Crops Are Fertilizer Factories." It certainly is interesting to read about a tremendous enterprise such as this one. It should be an inspiration to all vegetable growers in that even though they cannot equal the capacity of Seabrook Farms they should constantly experiment and keep up-to-date with new scientific practices.

Trenton, N. J. L. J. Brown

The New Look

Dear Editor:

I very much enjoyed the article by Dr. M. P. Rasmussen, "The New Look in Potatoes," which appeared in a recent issue. The idea of sorting potatoes by specific gravity interests me greatly, and I am looking forward to reading of further tests along this line.

Augusta, Maine J. Rider

Killing Weeds in Vegetable Plantings

Dear Editor:

In the March issue there is a most interesting and informative article entitled, "Kill Weeds Before You See Them." Mention is made of a practice in which we are very much interested—that of applying combinations of TCA with 2,4-D, chloro-IPC, or some other weed killer. I would appreciate your telling me who markets such a combination.

Will Alanap 1 control crabgrass, lamb's quarter, and pig weed? Can it be used on field corn and sweet corn?

New Church, Va. E. Spencer Wise

The weed killer combinations such as were mentioned in the article are not generally on the market but are being used commercially by simply adding both ingredients to the spray tank. In general, the weed killers are compatible when used in various combinations with the exception of combinations involving an emulsifiable oil formulation and a wettable powder. For example, chloro-IPC, which is generally formulated as an emulsifiable oil is not compatible with CMU or Alanap 1, which are wettable powders. TCA and 2,4-D are compatible and either of these can be mixed with most of the other common weed killers being used in crops.

Alanap 1 will control crabgrass, lamb's quarters, and pig weed. It cannot be used, however, on either field corn or sweet corn. Its main commercial use thus far has been on the vine crops such as cucumbers and melons and on asparagus.—Ed.

Dear Editor:

The article, "Kill Weeds Before You See Them," in the March issue of AMERICAN VEGETABLE GROWER was very interesting. I'm looking for something to control weeds and crabgrass in sweetpotatoes. Can you give me any information?

Makanda, Ill. E. D. McGuire

There is no weed killer that is recommended for use on sweetpotatoes. Purdue University has been doing experimental work on this crop for the past four years and work is now underway in Louisiana on the same problem. There have been some promising treatments but none of them have been explored sufficiently to make any recommendations as yet.—Ed.

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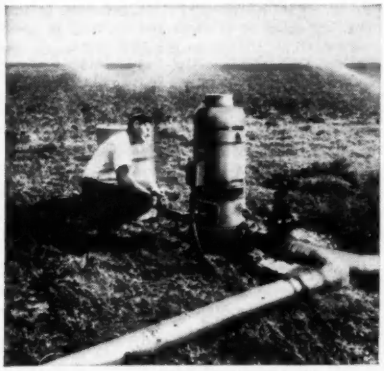
GENERAL ELECTRIC FarmNews

Ask for G-E Motors and Control on all Electrified Farm Equipment you buy!

MORE POWER TO THE AMERICAN FARMER through more electricity on the farm

AUTOMATIC PUMP PROVIDES "CITY WATER SERVICE"

NEW TYPE IRRIGATION PUMP INCREASES COTTON YIELD



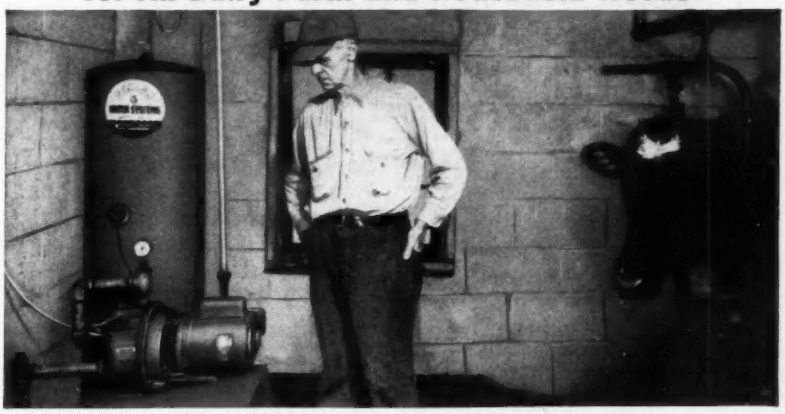
Pump company representative checks new design deep well pump on Mr. Olsen's farm.

Mr. Eric N. Olsen of Fresno, California, sprinkler-irrigates his 75 acres of cotton with new design deep well pumps. "I've found that I get better use from the same amount of water since these new type pumps were installed, which means increased yield and additional profit," says Mr. Olsen.

These pumps raise the water from wells and drive it through the pipes and out the sprinkler system at better than 40 pounds pressure, all in one operation. This means no booster pumps are needed for sprinkling.

Mr. Olsen's pumps are of the deep well turbine type, but they have a special impeller mounted in the pump head at ground level. This impeller does the work that would otherwise require three or four extra turbine bowls. These new sprinkler pumps are powered by dependable General Electric motors. For additional information check "deep well pump" on coupon.

New Water System Delivers Plenty of Fresh Water for All Dairy Farm and Household Needs



Mr. Porter is shown with his labor-saving water system. He gets 300 gallon per hour capacity with this pumping arrangement.

Mr. Alvan B. Porter and son Carl of Apulia, New York, never worry about having an adequate supply of fresh running water available—their new fully-automatic water system provides "city water service" for all of their 55-acre dairy farm needs. As Mr. Porter says:

"I'm thoroughly pleased with my pump's operation and find it can take care of my barn and household needs without any strain. My cows have plenty of drinking water in front of them all the time. I hardly ever go near the pump —once in a while I look at the water-pressure gauge".

In addition to furnishing the daily water requirements for 28 head of livestock, the Porters' water system supplies drinking and household water for their 12 room house with inside bath.

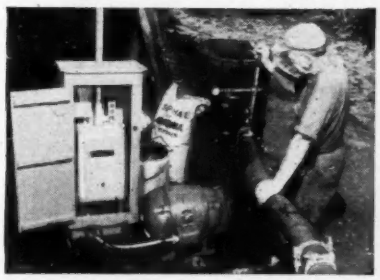
Powered by a G-E motor with built-in overload protection, this pump unit provides ample water for cleaning barns, tractors, farm implements and the automobiles. Mr. Porter washes his manure spreader every day and it still looks like new after three years of hard use. For more information check "water systems" on coupon below.

OREGON FARMER DOUBLES GROSS WITH SPRINKLER IRRIGATION SYSTEM

Mr. Carl Sande, Star Route, Forest Grove, Oregon, one of the most successful crop farmers in the region says: "I double my gross profits by using a sprinkler irrigation system". Mr. Sande irrigates 30 acres of land from a creek with the pump shown below. This pump supplies 360 gallons per minute at 70 pounds pressure. It is driven by a G-E close-coupled 20 hp motor. The motor is protected by a rugged G-E motor starter.

A big advantage is that Mr. Sande can have automatic starting and stopping of his irrigation since the pump is also equipped with a G-E time switch. He can put it on a new setting last thing at night and go to bed with confidence that the G-E time switch will shut it off at the predetermined time. For information check "sprinkler system" on coupon.

Sprinkler irrigation gives uniform distribution of fertilizer while irrigating.



Mr. Sande adjusts valve to feed right amount of ammonium sulphate into water.

GENERAL ELECTRIC COMPANY
Section 330-1F, Schenectady 5, N. Y.

I would like additional information on the following equipment.

- ☐ Automatic Water System
- ☐ Irrigation Pump
- ☐ Sprinkler System
- ☐ How To Choose Your Motor

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ADDRESS_____

CITY_____ STATE_____

CALENDAR OF COMING MEETINGS & EXHIBITS

July 13 (10:00 AM)—Indiana State Vegetable Growers Association summer meeting, Purdue University, Lafayette.—F. C. Gaylord, Sec'y, Dept. of Hort., Lafayette.

July 20—Southern Minnesota Vegetable Growers tour and field day, Hollandale.—Orrin C. Turnquist, Sec'y, MVGA, St. Paul 1.

July 22 (1:00 PM)—Muck Crops Field Day, Muck Farm, Walkerton, Ind.—F. C. Gaylord, Dept. of Hort., Lafayette.

Aug. 5—Empire State Potato Club, Inc., annual summer field day, William Meyer Farm, Gainesville, Wyoming County, N. Y.—Philip Luke, Trade Show Mgr., RFD, Fulton, N. Y.

Aug. 10–12—Ohio Pesticide Institute summer tour, beginning at Wooster and finishing in northwestern Ohio. Dinner on the 10th will commemorate 100 years of entomology.—J. D. Wilson, Sec'y, c/o Ohio Agr. Exp. Sta., Wooster.

Aug. 23–27—Centennial of Farm Mechanization, Michigan State College, East Lansing.—A. W. Farrall, Head, Agr. Engng. Dept., Mich. State College, East Lansing.

Sept. 23–25—Texas Citrus and Vegetable Growers and Shippers, Inc., annual meeting, Baker and Adolphus hotels, Dallas.—Austin E. Anson Exe. Mgr., 306 E. Jackson, Harlingen.

Sept. 28–30—Florida Fruit and Vegetable Association annual meeting, Sans Souci Hotel, Miami Beach. Association headquarters: 4401 E. Colonial Drive, Orlando.

Oct. 3–5—Produce Packaging Association 4th annual conference and exposition, The Shoreham Hotel, Washington, D. C.—Robt. A. Cooper, Exec. Sec'y, 500 Fifth Ave., New York 36, N. Y.

Nov. 2–4—Western Growers Association Annual meeting, Hotel del Coronado, Coronado, Calif. C. B. Moore, Exe. Vice-Pres., 606 South Hill St., Los Angeles 14.

Nov. 15–17—American Veneer Package Association, Park Sheraton Hotel, New York City. Association headquarters, 1225½ North Orange Ave., Orlando, Fla.

Nov. 29–Dec. 2—Vegetable Growers Association of America annual convention, Syracuse, N. Y.—Joseph S. Shelly, Sec'y, 528 Mills Bldg., Washington, D. C.

Dec. 5–9—National Junior Vegetable Growers Association 20th annual convention, Cincinnati, Ohio.—Grant B. Snyder, Adult Advisor, Univ. of Mass., Amherst.

NEW USE FOR SPRINKLERS

BECAUSE of stream pollution, Ohio canners are turning to other methods of disposing cannery wastes. H. D. Brown of Ohio State University suggested early in 1950, the use of portable sprinkler systems to return the wastes to the fields.

Nearly 30 per cent of Wisconsin canners are now spraying wastes on pastures or on hay crops. Yield increases are said to be considerable.

Under Dr. Brown's leadership, Ohio canners have established a model plant to handle wastes from asparagus, peas, corn, lima beans, pumpkins, kidney beans, and mush at the Esmeralda Canning Co., Circleville, Ohio.

How to choose an IRRIGATION SYSTEM

Successful growers present suggestions to help you solve your irrigation problems

By ELDON S. BANTA

IRRIGATION is a means to an end; a tool to be used in growing vegetables more efficiently. The practice doesn't fit all farms alike, nor do all crops respond alike to it. The relation of irrigation to soils is important and may be specific for your farm. We just can't lay down here a how-to-do-it formula and expect you to be completely satisfied with it on your particular farm.

We can present some suggestions and explain how others have set up their irrigation programs and keep them operating. From these we hope you will find some helpful hints to improve or develop a system for your particular conditions.

When I stopped to ask Aaron Lockheart, veteran potato grower of Bellville, Ohio, about irrigation, he quickly laid his finger on one of the most important considerations. Even before you get in an engineer to lay out your system, he suggests that you know something about your soil.

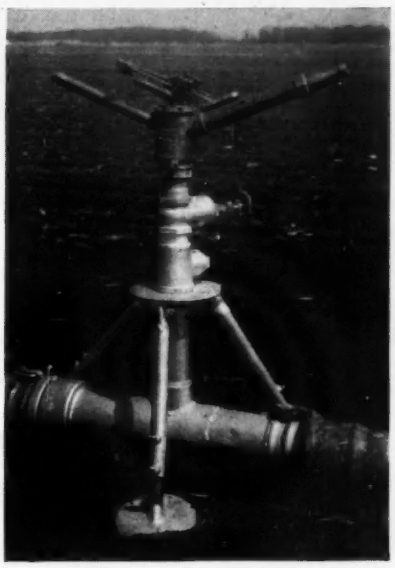
What is its water-holding capacity? How fast will it take water and not run off? These are two big questions Lockheart feels need to be answered before you can accurately design your system. He grows most of his potatoes on fairly heavy loam soil and cannot apply water over an inch and a half an hour. So he has his system engineered to this rate.

The crop you are growing is an important first consideration, too. How deep does it root? How fast does it use up soil moisture? At what growth stages does it need most water? If you can arrive at some accurate estimates for these, then you will be able to design an irrigation system that most nearly meets your needs.

Up to now there has been no convenient way of arriving at the answers to the important soils and crops questions. However, the Soil Conservation Service, co-operating with state colleges, experiment stations, and extension services, has recently embarked upon a program to supply information to prospective irrigation users.

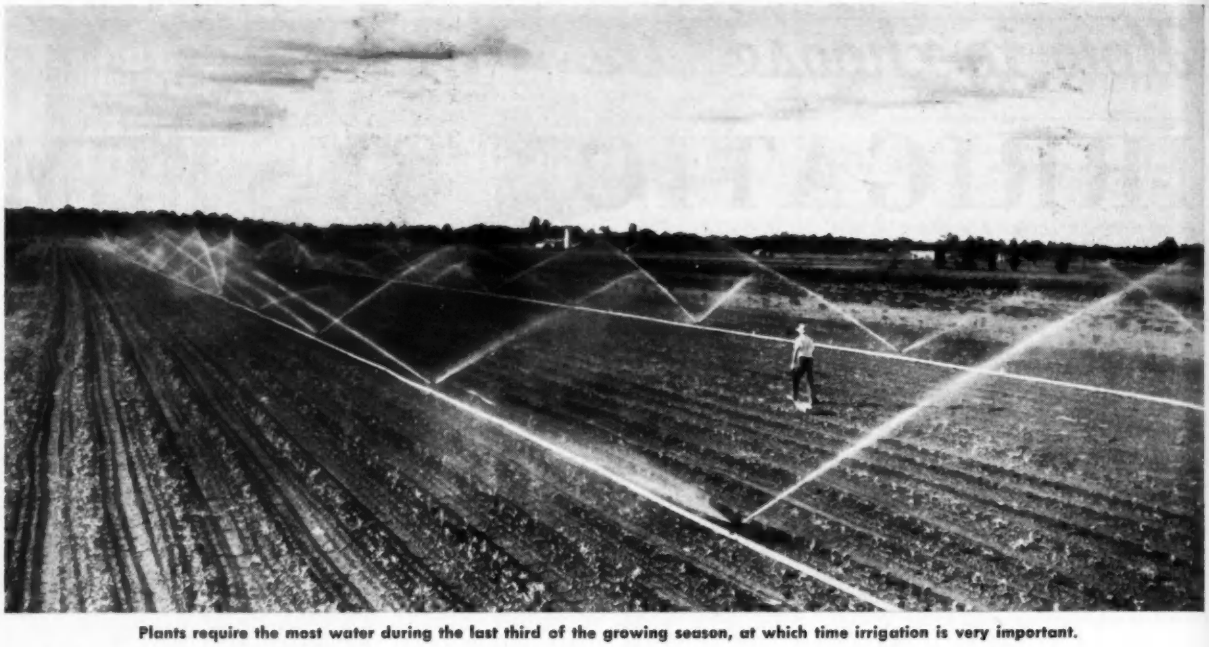
Ohio and Michigan are among the first of the many states to have a set of data prepared and ready for distribution to interested persons within their respective states. The very useful booklet is entitled, "Conservation Ir-

(*Continued on page 22*)



Skinner sprinkler head at top of column is used by Gehring Farms, Rensselaer, Ind. Head has capacity of 250 g.p.m. at 90 pounds pressure. It is welded to a section of lateral pipe and a sturdy stand. Stand was designed by Gehring Farms, co-operating with Chicago Metal Mfg. Co.

Gorman-Rupp portable irrigation pump at left, used on Gehring Farms, develops 1,000 g.p.m. at 140 pounds pressure. It can be pulled along drainage ditch with tractor and new settings made quickly. Both the pump and Continental gasoline motor are mounted on the trailer.



Plants require the most water during the last third of the growing season, at which time irrigation is very important.

Consider These Facts BEFORE YOU IRRIGATE

Know your soil and your plant growth habits and you will be well on the way to success in irrigating

By JOHN H. MacGILLIVRAY
University of California

VEGETABLE crops consist largely of water in unchanged form but also water that has served as one of the raw materials for the plant's dry matter. Although the plant uses a large amount of water there is usually a large supply stored in the soil. Much of the time we are not concerned with low yields from inadequate water. However, when there is insufficient water, the effect on vegetable yields is more drastic than that from other cultural factors.

To maintain maximum yields it is essential for the roots to be furnished with available water. As long as the water quality is desirable, the plant root does not distinguish between water from rain, sprinkler, surface, or sub-irrigation. The plant's problem is to have available enough water which must contain some oxygen. For a few days after a heavy rain or irrigation, the water moves downward. When this movement stops, the soil is said to be at "field capacity" which may be taken as the upper limit of moisture readily available to plants.

The plant roots gradually reduce the moisture until there is none available in the root zone; then, unless water is added immediately, plant growth will be retarded. This lower limit of moisture is sometimes indicated by wilting and is known as the "permanent wilting percentage" of a soil.

Yolo Fine Sandy Loam might be used as an example where the field capacity is 16.8 per cent and the permanent wilting percentage is 8.9 per cent. It holds one and one-fourth inches of available water per foot of depth.

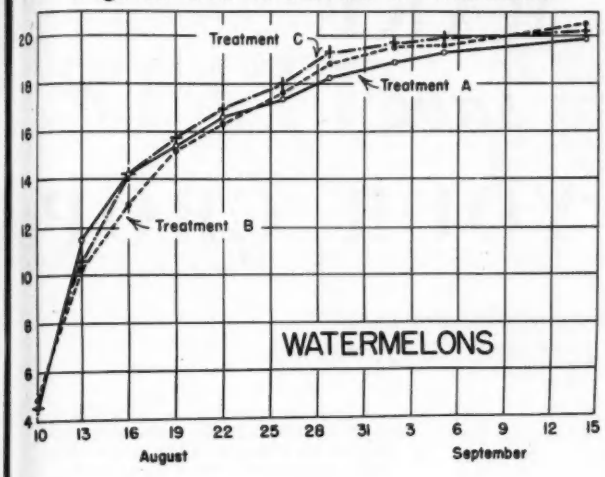
Since water is stored in the soil for plant growth, it may be considered a reservoir or perhaps in common language a tank. The capacity of this reservoir varies with soil type and rooting depth of vegetables. Vegetable crops may be grouped as to depth of rooting —as shallow, medium, and deep rooted crops. The first group have most of their roots in the top two feet, the second group the top four feet, and the last group the top six feet. Cool season crops of small plant size are usually shallow rooted. Large warm season crops plus perennials are deep rooted.

Most soil types vary as to the amount of available water they hold, but the following general rule will be found useful. Sandy soils contain three-fourths inch of available water, loams one and one-half inches, and clays two and one-half inches. We might illustrate the idea by considering lettuce and tomatoes grown on a sandy soil and clay soils.

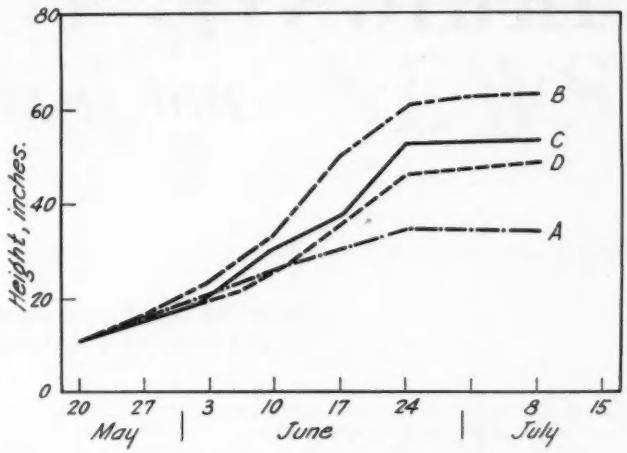
Not only does soil type and depth of rooting affect the frequency of irrigation and amount of water applied, but also the loss of water from the surface few inches of soil. In many areas the water in the top few inches of soil is dried out by the sun and roots do not grow in this soil zone. The sun removes not only the available water but also sometimes a small amount of un-

JOHN H. MacGILLIVRAY is author of the book, *Vegetable Production*, published by The Blakiston Company in 1953 and obtainable from American Vegetable Grower, Willoughby, Ohio, for $5.

Irrigation Effect on Diameter of Watermelons



Irrigation Effect on Height of Golden Bantam Corn



On charts above and left, Treatment A received no irrigation; B, ample water; C, medium amount of water; and D, light irrigation. Spread of curves shows corn growth was greatly affected by irrigation while little effect was evident on watermelons.

available water. Thus if the four inches of soil is dried by the sun, it would represent a requirement of at least one-fourth, one-half, and eight-tenths inch of available water for the three soil types mentioned above.

Effect of Crop and Soil Type on Size of Soil Moisture Reservoir

Crop	Soil type	Rooting depth Feet		Water per foot of depth at F. C.	Water in soil moisture reservoir
Lettuce	Sand	2	X	¾	1.5 inches
Tomato	Sand	6	X	¾	4.5 inches
Lettuce	Clay	2	X	2½	5.0 inches
Tomato	Clay	6	X	2½	15.0 inches

Except in the case of subirrigation the top four inches are wet before any water passes down to the root zone area. Sprinkler irrigation of one inch of water would make only 75 per cent of this water available to the plant on a sand but only 20 per cent on a clay.

Tests have been made on the germination of vegetable seed in soils full of available water and also various lesser amounts. Celery seed is unique in that germination is reduced rapidly as the soil moisture drops below field capacity (16.8 per cent for a Yolo Fine Sandy Loam). Thus celery seed should be germinated at or slightly above field capacity if maximum germination is desired.

Some vegetable seeds will germinate below permanent wilting percentage to a limited extent. Some will do fairly well when the soil is only half filled with available water (or 12.9 per cent for a Yolo Fine Sandy Loam). In all cases vegetable seeds germinate most rapidly when the soil is close to field capacity.

Under circumstances where keeping the soil at field capacity is not expensive like a greenhouse or cold frame this consideration is worth remembering. One advantage of sprinkler irrigation is the possibility of applying small amounts of water which completely wets the soil around the seed.

The grower needs to be familiar with soil types on his farm to determine an accurate irrigation schedule. Irrigation experiments are helpful to develop principles but the results must be modified to suit individual farms.

Insufficient available water can be detected either by examining the soil or the plant. As water is removed from the soil it changes in color, feel, or the ability to be molded into a cast. As plants are able to obtain insufficient soil moisture, their growth slows down and their color changes. Wilting of plants in the field as an indication of lack of water is not characteristic of many vegetable plants. Corn will wilt and also some small rooted plants. Wilting is not serious unless the plants fail to revive during the night and are wilted the next morning at 6 to 7 a.m.

The reason why most plants don't show evidence of wilting is because

(*Continued on page 19*)

Depth of Rooting of Vegetable Crops and Total Amounts of Irrigation Water Suggested for Commercial Production in California

Shallow-rooted (down to 2 feet)	Water depth	Moderately deep-rooted (down to 4 feet)	Water depth	Deep-rooted (down to 6 feet)	Water depth
	inches		inches		inches
Brussels sprouts	12	Beans, pole	15	Artichokes	12
Cabbage	12	Beans, snap, spring	12	Asparagus	20
Cauliflower	12	Beans, snap, fall	18	Cantaloupes, inland	18
Celery	30	Beets	18	Cantaloupes, Imp. V.	24
Lettuce, winter	6	Carrots, coastal	18	Lima beans	12
Lettuce, summer & fall	18	Carrots, Imp. V.	24	Parsnips	20
Lettuce, Imperial Valley	18	Chard	18	Pumpkins	18
Onions, intermediate	15	Cucumber	15	Squash, winter	18
Onions, late	24	Eggplant	18	Sweetpotatoes	18
Potatoes, early	30	Peas, winter	6	Tomatoes, inland	24
Potatoes, late	20	Peas, fall	18	Tomatoes, coastal	12
Radish	12	Peas, Imp. V.	18	Watermelons	15
Spinach	9	Peppers	18		
Sprouting broccoli	12	Squash, summer	18		
Sweet corn	18	Turnips	15		

Onions are very shallow-rooted. With this crop it is necessary to maintain available water in the surface 6 to 10 inches for maximum yields.

Potatoes, lettuce, and corn develop poor root systems. A few roots penetrate deeply, but they are not numerous enough to permeate the soil thoroughly at greater depths. It is necessary to keep available soil moisture in the surface foot of soil, especially for the first part of the growing period.

Growers believe that frequent irrigations give best yields with celery.

Tomatoes will root 6 feet or more in deep soils before irrigation is necessary. Apply heavy irrigations before harvesting, and wet the soil to 6 feet. With canning tomatoes, in most soils no irrigation will be necessary during the harvesting period if the soil has been thoroughly wetted just before harvest.

Cantaloupes will root to nearly 6 feet by maturity. There may be reduction in set of late fruit when moisture is almost depleted in the surface 3 feet. The size of melons is not materially affected by soil moisture.

Courtesy, California Agricultural Experiment Station Lithoprint Leaflet, 1943.

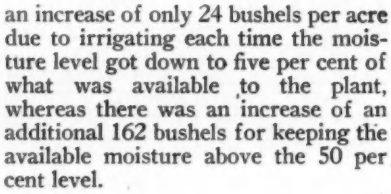
IRRIGATE TO MAKE *not just to save* YOUR CROP

Maintain your soil moisture supply above the 50 per cent level and watch your crop yields soar

By **ARTHUR J. PRATT**
Cornell University

RECENT experimental work throughout the "humid" eastern United States has shown that the time of irrigation in relation to the amount of available moisture still left in the soil is more important than whether a crop is "just irrigated" or whether it is allowed to depend on what rain may fall. One farmer in Erie County, New York, said, "I irrigated snap beans for four years to save them from drought and it never was profitable, but last year I decided to start early and irrigate to make a crop and not just to save it. For the first time irrigation paid me. I got three tons of green beans to the acre where I irrigated and one ton where I didn't."

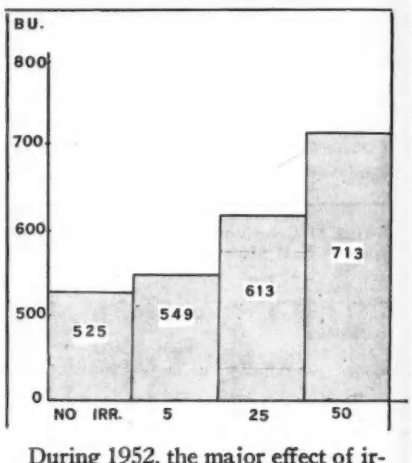
Test plots on irrigation to maintain certain soil moisture levels were conducted by Cornell University at two different locations in 1952 and one location in 1953. Onions and potatoes were used as test crops. The potato yields are shown graphically on the accompanying chart. It can be seen that in the average of these tests there was an increase of only 24 bushels per acre due to irrigating each time the moisture level got down to five per cent of what was available to the plant, whereas there was an increase of an additional 162 bushels for keeping the available moisture above the 50 per cent level.



Moisture meter was obtained from the Delmhorst Instrument Company, Boonton, N. J., at a cost of $40, and the moisture blocks cost 40 cents each. It is well to have several blocks in a field and take the average of the readings at each level. With irrigation equipment worth several thousand dollars, growers can hardly afford to be without some moisture-detecting device. Tensiometers are a nuisance to tillage, require much care, and are too expensive.

Big irrigation nozzles or "guns" such as this one that has a large opening of one and one-quarter inches will irrigate up to three acres in one setting but the patterns are difficult to fit together and high pressures are required (90 pounds at the nozzle) or the water will come down in big drops that will injure small plants and puddle the soil surface. Smaller rotating nozzles or perforated pipe are preferred by most growers. With any type of sprinkler, the water pressure should be adequate to break up the drops small enough to avoid splash-puddling of the soil surface. The rate of application should be slow enough to avoid any surface runoff.

YIELD OF POTATOES WHEN IRRIGATION WAS STARTED AS SOON AS AVAILABLE MOISTURE GOT DOWN TO PERCENTAGES SHOWN AT BOTTOM OF CHART



During 1952, the major effect of irrigation on potatoes was to increase the number of potatoes over two inches in diameter while the average size of the tubers did not change much. On the other hand, in 1953, the major effect of irrigation was to increase the average size of the tubers over two inches. The author and others had found in irrigation tests for several years previous that potatoes that suffered from drought during the blossom (tuber-set) stage would set fewer potatoes per plant than if plenty of moisture was available at that time.

The onions in the Cornell test produced 913 bushels per acre when irrigated as soon as the available moisture got down to the 50 per cent level, but only 690 bushels per acre if the available moisture level dropped to five per cent before irrigating, and 520 bushels if allowed to depend on rainfall only. With both the onions and potatoes, the treatments were repeated four times in each test.

If it is so important to keep the available moisture level from dropping below 50 per cent, how can we measure that level? There are several ways to do this, but the simplest is the use of

(*Continued on page 15*)

STATE NEWS

- **Asparagus Acreage Continues to Climb in Michigan**
- **Marketing Agreement Proposed for Maine Potatoes**

MICHIGAN—The state's onion crop is largely planted, with fields in many areas up and showing good stands. Michigan onion acreage appears to be about the same as 1953. Growers in some areas are using chloro IPC extensively for pre-emergence weed control.

Asparagus growers are still increasing their acreage, slowly but steadily. Apparently the quality of this product under Michigan growing conditions has helped to maintain a firm market and good demand in spite of the increasing production.

A large portion of the Michigan crop has gone to the processors in the past and this still remains a major and a healthy outlet. However, 1953 saw the beginning of two projects to expand the fresh market outlet. Max Smith, Milburg (Mich.) Growers Exchange manager, working with the Southwestern Michigan Asparagus Growers Association, explored the possibilities last year. This year Max and the Growers are boosting their fresh market project and hope to double last year's tonnage. Michigan Mushroom Co. at Niles is also marketing fresh asparagus. Demand is good for both the fresh and frozen product.

Michigan celery under paper covers looks excellent. Low temperatures in late April and early May may cause some premature bolting on the crop that was not covered.

Growers are expressing a definite preference for Cornell 19 for a golden variety but experienced difficulty obtaining seed of the variety this season.—*J. W. Rose, East Lansing.*

MAINE—A hearing to consider a proposed federal marketing agreement and order for Irish potatoes grown in Maine was held at Presque Isle on April 27. The hearing was requested by the Aroostook County Farm Bureau, the Potato Industry Council of Maine, Inc., the Fort Fairfield Potato Growers Association, and the Young Farmers of Central Aroostook. Terms of the proposed agreement and order were worked out by the industry groups requesting the hearing.

The proposal is similar to the federal marketing agreement and order which was in effect for Maine potatoes during the 1948, 1949, and 1950 crops. The purpose of the April 27 hearing was to receive evidence on each phase and part of the proposal. The next step is the recommended decision. If the Secretary of Agriculture approves the program, the proposed order will be submitted to a referendum vote among potato growers.

The USDA has seven federal marketing order programs in effect for potatoes. Four orders are active, and in response to committee recommendations, grade and size regulations were issued by the USDA for the 1953 crop. These four programs are Idaho—Eastern Oregon; Colorado; Central Oregon—Northern California; and Washington.

In the three other areas—Eastern South Dakota, Virginia—North Carolina, and New England (except for Maine)—the respective committees decided against recommending any grade and size regulations and as a result programs are not active in these areas at this time.

OREGON—Bean picking wages of two and one-half cents per pound with one-fourth cent bonus for steady pickers, which is the same as last year's prices, was agreed upon by the Willamette Valley Bean Growers Association at its May meeting. The work in the bean yards has been done at a cheaper rate this spring, it was pointed out, but growers believed the minimum picking price should remain the same as a year ago.

One grower remarked at the meeting that present labor supply is the largest in 10 years, but a lot of help will be needed to pick the crop which this year has increased to more than 7,000 acres in the Willamette Valley.

Buyers have contracted the crop at $165 per ton for No. 1 beans and $140 a ton for No. 2 which usually makes up about two-thirds of a grower's crop. These also are the same prices as last year. Prices on lower grades have been increased slightly to $92.50 for No. 3 and $65 for No. 4 grade.

Next year, the association voted, the picking scale meeting will be held in July so that labor supply can be more accurately gauged after early fruit harvest in this area has been completed.

Bean growers have been using increasing amounts of chemicals for weed control in each of the past three seasons, according to Eddie Pullen, fieldman for a commercial chemist group, who spoke to the growers. This year materials for 18-inch row applications will cost about $1.87 per acre, he said.

Blossom drop, a serious loss to bean growers, is caused by insects or extremely high temperatures associated with lack of moisture, Dr. S. B. Apple of Oregon State College, told the group. The problem is most serious in bush bean fields, he added. Apple suggested that growers check soil acidity each four or five years, since with an acid soil the bean plant is a less efficient user of nitrogen, the most essential fertilizer in bean yards.

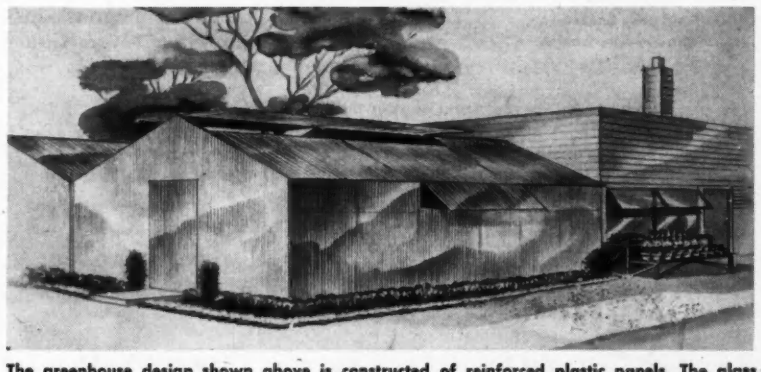
E. P. Glidewell of Aumsville is the new president of the association. Gordon Walker, Independence, is secretary for the coming year.—*Harold and Lillie Larsen.*

NEW HAMPSHIRE—The rainy, wet spring has favored development of cabbage and seed corn maggot. Early-planted sweet corn stands are very spotty because of maggot injury.

Over 40 acres of squash and cucumbers in Merrimack River Valley were started under hotents.

John Hardy of Hudson, who has the distinction of being the only man raising vegetables under glass in New Hampshire, has an excellent crop of tomatoes which he started to pick the latter part of May.

(*Continued on page 23*)



The greenhouse design shown above is constructed of reinforced plastic panels. The glass fibers incorporated in the corrugated sheets give the panels strength and diffuse the light so there are no shadows in the greenhouse. Plants touching the sides of the greenhouse even in freezing weather are reported unharmed because of low heat transmission, and condensation is reduced to a minimum. Panels can be sawed or drilled and easily put together with nails or screws. The material is impervious to rot, mildew, rodents, and termites, and no hail insurance is needed since the panels are shatterproof. Framing of the greenhouse is entirely of aluminum. Plans for building the plastic greenhouse can be obtained from Monsanto Chemical Company, Texas City, Texas, for 25 cents which covers the handling and mailing.

We Must Irrigate Scientifically

Here is a new approach to the problem of when to irrigate, by a noted authority on climatology

By C. W. THORNTHWAITE

NO farmer would expect to get peak yields without properly preparing his seedbeds, selecting good seeds, adequately fertilizing his fields, and controlling pests. Yet, farmers do expect high yields without proper irrigation. The use of irrigation should be as much a part of the overall farming program as plowing, fertilizing, and dusting.

Irrigation is a cure for drought—that climatic condition which occurs when the natural rainfall does not bring to the plants as much water as they need for best growth and development. Stored soil moisture is used up and the plants begin to suffer from a lack of water.

The seasonal drought of the arid and semiarid regions is easily recognized, but there is a type of drought which exists in the humid regions almost every year which is seldom detected. This is called hidden drought and it results in a great reduction in the potential yield of a crop. Even when showers seem to be frequent and abundant, the rainfall may not equal the water need and a borderline water deficiency or hidden drought will result. Drought constitutes agriculture's greatest natural hazard.

Drought in eastern United States has been recognized for many years, and so has the need for supplemental irrigation. However, most of the irrigation is found in the West. In 1950 in 25 eastern states there were only 145,000 irrigated acres on 6,500 farms, while in the 11 western states, 20 million acres were irrigated on nearly 250,000 farms.

Technological developments have greatly improved the engineering phases of irrigation practice. These technological advances have made irrigation equipment more practical to use.

Essential Cultural Operation

But irrigation farming is not just ordinary farming with irrigation. In order to perfect a system of irrigation farming, we must fit irrigation into other necessary farming practices such as cultivation, weed and pest control, and fertilization; and as farmers gain

experience with irrigation, the whole complex of farming practices will be reorganized to harmonize with the condition of never-failing soil moisture.

The increases in crop yields are so spectacular under scientific irrigation that no farmer can afford to irrigate in any other way. However, the practice of irrigation is not yet scientific because farmers do not know how much water is needed or when it should be applied. Often the water is applied late or in insufficient quantities. In other cases, it is used in excess. The present method of using irrigation has not given farmers the needed increase in crop yields.

In the absence of a practical guide for irrigation, common practice is to watch the plants for signs of moisture deficiency as the basis for supplying water. Obviously, this is not good practice because the aim of irrigation is to prevent signs of water stress from appearing in plants. Instead of watching the crop for indications of drought, some investigators suggest watching the soil instead. While many devices have been developed to indicate the amount of water in the soil, they do not give the information that is needed for scheduling irrigation.

Since drought is a climatic matter, there is a climatological approach to the problem of irrigation scheduling. We regard the moisture in the soil as being a balance between additions to it as a result of precipitation and losses from it through evaporation and transpiration. Precipitation is easy to measure, and good farmers regularly keep account of it. But it is not easy to measure evapotranspiration.

(*Continued on next page*)

ABOUT THE AUTHOR

Dr. C. W. Thornthwaite is a leading authority on agricultural climatology in the United States. In addition to his position as director of the Johns Hopkins University Laboratory of Climatology at Seabrook, N. J., he is president of the commission for Climatology of the World Meteorological Organization and is alternate U. S. member of the advisory committee on Arid Zone Research of UNESCO. Dr. Thornthwaite is head of a private consulting service.

He is the originator of the Thornthwaite Classification of Climate which originally appeared in 1931 and was revised in 1948. His studies of evapotranspiration have set new standards in determining losses of moisture from the soil, and his methods of making daily observations of plants have given new direction to the studies of rates of plant growth, particularly applicable in crop scheduling and scientific irrigation. These studies have led to the development of the "Cropmeter," a device which is available to gardeners for determining planting and harvesting dates.

Figuring soil water needs with the Irrigation Guide. A manual and rain gauge are also shown.

IRRIGATE SCIENTIFICALLY

(*Continued from page 13*)

We have, however, devised a practical way of determining the water loss from the soil from ordinary weather records. Thus, we can compare the daily loss of moisture from the soil through evapotranspiration with the daily rainfall. From this an irrigation program can be set up as a sort of bookkeeping procedure.

The moisture in the soil may be regarded as the amount on deposit as in a bank account. Precipitation adds to the account and evapotranspiration withdraws from it. We merely need to keep track of the evapotranspiration and restore by irrigation whatever is not promptly returned by precipitation. This avoids over-irrigation and at the same time assures that soil moisture is never deficient and that plants never show signs of distress.

Scheduled Irrigation

The missing element in scientific irrigation has been a way to know when and how much to irrigate. The bookkeeping procedure supplies this missing element; but in order to have practical usefulness it must be so simple that an operator can use it easily and quickly. Accordingly, we have concentrated on reducing the whole system to a few simple steps, with handy aids to assist in each one.

What is in prospect in the immediate future is a kit that will contain a device to determine the evapotranspiration, a rain gauge to measure the precipitation, and a simple slide rule to keep track of the water balance and to tell the operator when to irrigate. The elements are all simple and the complete kit is inexpensive enough to permit any irrigator to own one. At present such a kit is available for the New Jersey area, and they shortly will be available for the rest of the country. THE END

Readers wishing to make inquiries or to place advance orders for the Irrigation Guide should write to F. G. Sientz, Seabrook, N. J.

IRRIGATE TO MAKE

(*Continued from page 10*)

gypsum moisture blocks and a small electrical resistance meter, such as the Delmhorst moisture meter shown in the picture. The moisture blocks—usually six or eight in each field, are buried six inches and 12 inches deep in the crop row at planting time. The wire leads are attached to a stake that will help to locate them. The accuracy of the readings will be greatest when the crop roots have grown around the blocks. The moisture meter reads roughly in terms of per cent of available moisture.

Not only is the meter valuable to indicate when to irrigate, but it also can be used as a guide on how much to irrigate. Enough water should be supplied to bring the block readings at the six-inch and 12-inch marks back to 100. The amount of water that this requires will depend on the soil type as well as on its moisture content at the time that irrigation is started. If irrigation is started at the 50 per cent level, sandy soils may not need more than one-half inch of water to restock the top 12 inches, whereas heavy soils may require one and one-half inches.

If crop yields are going to be decreased if the moisture level drops below 50 per cent available moisture, it is clear that irrigation should be started before that level is reached or some fields will drop considerably below the 50 per cent level before they all can be irrigated.

With vegetable crops, it is desirable to have enough equipment to irrigate the entire crop area in five days on sandy soils and seven days on heavy soils. With very shallow-rooted crops these periods should be shortened. When temperatures are high and the ground is covered with vigorously growing plants, irrigation should be started at 75 per cent level. THE END

PIPE CARRIER

Lettuce grower Norman Harmon, Cumberland County, Scarboro, Maine, uses a simple carrier with a welded angle iron rack divided into four sections for carrying irrigation pipe around the farm. He uses either a tractor or pickup truck to tow the carrier and leaves it in the field until needed elsewhere.—*C. L. Stratton*

Tips on Buying IRRIGATION EQUIPMENT

Save yourself many headaches and money by making sure your irrigation system is designed for your farm

By E. H. KIDDER
Michigan State College

VEGETABLE growers on sandy soils in the humid states are rapidly accepting sprinkler irrigation. It isn't just drought insurance anymore. It's mighty handy to use to get a seeding started on time, and for transplanting too. Wind can "cut off" or "blow out" that new growth on sand and muck; a little water "holds it down."

The sprinkler irrigation system is usually made up of three parts. The pump delivers the water under pressure. Main and lateral pipe lines carry the water from the pump to the part of the field that we are going to irrigate. Rotary sprinklers, perforated pipe, or an oscillating pipe line on top of posts spread the water over the field.

The Pump Unit

The pump and its source of power is usually called the pump unit. The horizontal centrifugal pump is commonly used to take water from ponds, lakes, creeks, and rivers. It can also be used on shallow wells and "dug outs" IF the water level does not drop below the suction lift of the pump. Keep the pump fairly close to the water because the suction lift commonly ranges between 15 and 20 feet.

Centrifugal pumps are available in a wide range of sizes. They are easy to maintain. Don't buy that pump until your irrigation system has been designed to meet the needs of your farm. Then you will know how many gallons per minute and the pressure in pounds per square inch that this pump must deliver.

Go slow on buying a second-hand pump. Get the model and serial number off the name plate and check with the manufacturer to find out whether this pump will do what you want it to. The manufacturer's "performance curves" will show the gallons per minute and pressure that the pump will deliver at various speeds. Exhaust pump primers are available and can save a lot of time in priming the pump.

The turbine pump is commonly used on irrigation wells. Turbines are available for wells as small as four inches in diameter. Most turbine pumps have a drive shaft extending from the pump head at the ground surface down to the impeller bowls below the water in the well casing. Power to turn the pump shaft is transmitted either through a belt pulley, by a vertical electric motor, or a gear head from an engine.

Get a pump and power unit that is best suited to your needs. If you plan to expand your irrigation system within a few years, consider buying a pump and power unit that will take care of both present and future needs.

The pump manufacturers now supply "packaged units" of centrifugal pumps and power units in a wide range of sizes. The pump manufacturer "matches" a power unit of desired characteristics with his pump. The pump and power unit are mounted on the same skid or trailer frame.

While the electric motor, because of its convenience and dependability, is a desirable power unit, it is not commonly found on irrigation pumps in the lake states because of the lack of availability of three-phase power at a favorable rate on the farm. Gasoline engines of the air-cooled type are commonly found on the smaller pumps. When the power requirement exceeds

20 to 30 horsepower, the water-cooled industrial gasoline engine is commonly used. Diesel engines are found on some of the larger irrigation pumps. Smaller size Diesel engines will probably be used more in the future on irrigation pumps, paralleling increased use of Diesel engines on tractors.

The manufacturers of turbine pumps can recommend the size and speed of engine or motor to be used with their pump.

Main and Lateral Pipe Lines

The *main* pipe line carries the water from the pump to the field. The lateral pipe line distributes the water in the field. Portable main and lateral lines are usually made of aluminum and are equipped with quick couplers. In recent years aluminum pipe has been preferred by many growers because it is light and yet strong and durable. This pipe is commonly sold in 10, 20, 30, and 40-foot lengths. To many growers the 10-foot length represents an excess number of short pieces to be moved, and the 40-foot length may be a bit awkward to move on wagons, trailers, or tractors through narrow lanes and gates.

The Applicator

Rotary Sprinklers—Rotary sprinklers are most commonly found on systems in the Midwest. A wide range of sizes of sprinklers is available. A range of capacity of two to 10 gallons per minute is common in the lower pressure, one-nozzle size. Varying combinations of nozzle size and pressure give capacities of between approximately five and 200 gallons per minute in the two nozzle sizes. The large spinklers, sometimes called "gun" or "hydraulic," have capacities from 200 to over 600 gallons per minute. These "gun" sprinklers operate at high pressures and apply water rapidly.

Lengths of pipes, called risers, are placed between the lateral pipe and the sprinkler. The length of riser will depend on the height of crop to be cleared. Sprinkler spacing on the lateral line varies with the wetted diameter of sprinkler used. Use a sprinkler that does not put the water on faster than the soil will soak it up.

Perforated Pipe—Some use is made of perforated portable quick coupling pipe. The water is sprayed upward and outward in a rectangular pattern along the entire length of pipe. Operating pressure commonly ranges from five to 20 pounds per square inch. The width of wetted strip ranges from 25 to 50 feet. The application rates range from one-half to two inches per hour. This rate may be too high for some medium and heavy soils.

(*Continued on next page*)

TIPS ON BUYING

(*Continued from page 17*)

Fittings—The fittings consist of couplers, reducers, elbows, tees, valve opener elbows, tee valves, crosses, and end plugs. There is a difference in couplers in the ease with which they come apart and go back together. Each coupler has one or two replaceable rubber or plastic gaskets to "seal" it. Most couplers will drain when the pressure is released. If a tall riser pipe is going to be used in sweet corn, look for a coupler with a bottom plate to which a two- to four-foot length of board can be attached to keep the riser upright. Most couplers have some flexibility, thus allowing some change of pipe direction.

Tips on Equipment

1) Use a trash screen over the intake end of the suction line of the centrifugal pump. Set up an additional larger screened area if trash tends to clog the suction line screen.

2) *Don't buy* your irrigation equipment before you get the water. If your water is going to come from a well

a) Get the best possible information on wells from your state geological survey or state agricultural college.

b) Hire a reputable well driller who has the "know how" and the equipment to put down and develop a *large diameter* well.

c) Buy a pump and power unit *after* you know the capacity and water level drawdown of the well and the requirements of the irrigation system you plan to buy.

3) Get prices from several dealers for your entire system. Reputable dealers will check your water supply, soil, fields, cropping, and labor plans before they design the system. *The cheapest system is not always the most economical.* The cheapest may be an undersize system that just won't do the job.

4) *Buy all of your equipment, including the pump, from one dealer.* Only then can you expect him to warranty the system for proper design and operation.

5) Don't buy a "packaged irrigation system." *Each system should be designed for the individual farm.*

6) Go slowly on buying a "second hand" system. Consult the dealer who sells this line to determine whether it meets your requirements. You may have to buy a different pump unit, more pipe, and sprinklers. *Each farm calls for an individual design.*

7) Buy from a dealer who has readily available replacement parts and will provide good service and assistance.

8) Flush out your lateral lines with end plugs removed before you start putting on water. If your pipe has laid partially uncoupled for some time you may flush out rodents or rabbits.

9) Your system should apply water no faster than the soil will take it up. Runoff water represents wasted money.

10) Consult the agricultural engineering department of your state university for information on irrigation, your water problems, and sources of equipment.

11) Experiment to find out how much you can increase your yields by planting more seed per acre and by using more fertilizer. THE END

A reader writes, "Nowhere other than in AMERICAN VEGETABLE GROWER can I find advertised such a wonderful variety of equipment and products that the grower needs." Read the advertisements and remember advertisers will be glad to send you catalogs, specifications, and prices. Be sure to say you saw it in AMERICAN VEGETABLE GROWER.

CONSIDER FACTS

(*Continued from page 9*)

some of the roots are obtaining available water from deep areas of the soil. The plant obtains enough water to remain turgid but has insufficient for growth. Usually a slowing of growth due to insufficient water can be detected by making measurements.

When a soil is at field capacity, it is dark in color and becomes lighter as the soil approaches permanent wilting percentage. Just as the feel and color of a dry greenhouse potting soil is changed by sprinkling and mixing, you have the same change in field soils. Soils will vary as to their ability to be molded but always more so near field capacity. As the soil approaches permanent wilting percentage, it is difficult to mold into a cast.

To test a field soil for available water it should be sampled with a soil tube or augur. The soil should be taken in foot depths and laid upon the top of the soil to be examined. By this procedure you can determine whether you need to irrigate. With shallow rooted crops the soil should be tested to a depth of two feet, and for others at least to four feet.

Effect of Irrigation on Yield.

If a crop is able to obtain sufficient water from the soil without irrigation, it is obvious irrigation will not increase yield. Likewise shallow rooted crops and sandy soils are more likely to respond to irrigation than crops with a large soil moisture reservoir.

At Davis with average rainfall (16.9 inches) our soils are filled to field capacity to a depth of six feet or more by winter rains. Under these conditions we can increase the yield of sweet corn 500 to 1,000 per cent by irrigation but do not greatly affect deep rooted crops.

Another consideration is also important to the production of high yields. We tend to neglect our crops the last third of the growing season either by no irrigation or by insufficient irrigation. This is the period when the plants require the most water. I would like to cite some data for the canning tomato crop at Davis. These are the amounts of water used for periods during the cropping season: Up to the end of June, 1.5 inches; July, 5.5 inches; August, 6.4 inches; September, 6.0 inches; October, 2.2 inches, or a total of 21.6 inches.

You need to watch the water supply in your soil moisture reservoir as the plants approach maturity during August and September. A lack of irrigation in June is not serious if the plants have started growth after transplanting. This same principle can be applied to other vegetable crops which have a shorter growing season. THE END

IRRIGATING SWEETPOTATOES

Heavy fertilization plus irrigation pays dividends

IRRIGATION and fertilization experiments with sweetpotatoes have been going on at the Muscatine Island Field Station, Fruitland, Iowa, since 1949. Each year the tests have shown quite conclusively the advantages of heavy fertilization combined with adequate irrigation. The following chart shows the record thus far.

Effect of Irrigation and Fertilization on Yields of No. 1 Sweetpotatoes, 1949-53.

Irrigation Interval Days	Fertilizer Pounds per Acre	Yield—Bu. per acre 4-Year Average 1949-52	1952	1953
11 *	700	...	...	...
11 *	1200	...	...	...
7	700	160	140	179
7	1200	212	168	282
7	1700	...	142	220
3.5	700	...	128	172
3.5	1200	...	205	215
3.5	1700	...	220	321

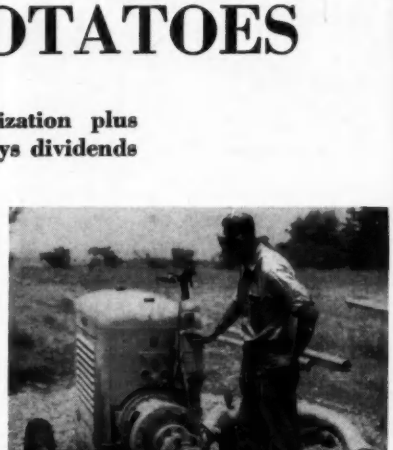
* Used only during first two years.

Three fertilizer treatments, 700, 1,200, and 1,700 pounds per acre of 3-9-18, were compared under different rates of water application. Water was applied one inch per application at 11-, 7-, and 3.5-day intervals. Yields are on the basis of No. 1 sweetpotatoes per acre harvested. Total yields would run somewhat higher.

On the basis of these results, Lewis E. Peterson, superintendent of the field station, is recommending to growers the use of 1,200 pounds of 3-9-18 per acre under the practice of irrigating at seven-day intervals. If irrigation is less frequent, then fertilizer rates should be reduced to about the 700-pound level. If water is applied at the 3.5-day interval, then it may be possible to use 1,700 pounds of fertilizer to advantage. However, if water is applied at the short intervals, some observations by Mr. Peterson indicated that the nitrogen level might have to be raised in order to gain an economical increase in yield.

For the four-year period, 1949-52, an annual average of seven inches of water was required. In other words, seven applications were necessary during the growing season, which covered roughly July and August.

The soil at the Muscatine Island station is very sandy, underlaid with gravel, and subject to drought conditions. For continued high yields of sweetpotatoes on such soils, irrigation is practically a necessity. At present about 80 per cent of the acreage in the area is under irrigation.



Lewis Peterson, superintendent of Muscatine Island Field Station, Fruitland, Iowa, with irrigation pump and well which furnished water for irrigation-fertilization experiments.

The point Mr. Peterson emphasises is this: Growers have needed more information correlating fertilizer rates and irrigation. That is what he has been doing and now he can suggest to growers a definite program. Heretofore the practice has been to apply about 700 pounds of fertilizer and irrigate at 11-day intervals. Now, through Mr. Peterson's studies, growers will be able to increase yields by at least 52 bushels per acre by following recommendations.

DO NOT TOUCH POWER LINES WITH PIPE

The following clipping from the *Wenatchee Daily World,* April 9, 1954, deserves posting at every grower's pump house:

"Stanley S. Griffin and John E. Griffin were electrocuted at their farm near O'Sullivan Dam late Tuesday afternoon when a section of aluminum irrigation pipe contacted a power line. It is believed the two had stood a section of pipe on end to try to dislodge some dirt when it touched the power line."

There were at least two deaths from the same cause during 1953 reported to AMERICAN VEGETABLE GROWER.

NEWS FROM YOUR SUPPLIERS

For a leaflet describing Malaphos insecticide, write **Eston Chemicals Division, American Potash & Chemical Corporation,** 3100 E. 26th St., Los Angeles, Calif. Malaphos is the trade name for malathion recommended for spider mites, aphids, leafhoppers, mealybugs, and soft brown scale. It is recommended for use on such crops as apples, pears, tomatoes, beans, peas, and ornamentals.

For those who grow berries, the 1954 price list, published by **The Berry Patch,** Honeoye Falls, N. Y., will be interesting. It contains descriptions of new berries and is attractively illustrated with colored photographs.

California Spray-Chemical Corporation, Richmond 4, Calif., reports that captan has been approved for use as a strawberry harvest rot control. Captan is formulated and sold under the trade name Orthocide by California Spray-Chemical Corporation. Up to 66 per cent greater yield for Orthocide treated strawberry plots has been recorded in some sections of the country, and all testing areas have noted definite improvement in the control of Botrytis rot. Not only did the Orthocide give yield increases, but also increased the transit storage life of strawberries.

Growers will be interested in the booklet, *Descriptive Reference Manual of Cantaloupes,* which was written by the plant breeding department of Lawrence Robinson & Sons. It describes every worthwhile variety of cantaloupe being grown in this country. Data in the booklet are based on performance trials at the company's testing grounds at Gridley and Modesto, Calif. The informative booklet may be obtained free of charge by writing Larry Robinson, Jr., **Lawrence Robinson & Sons,** Modesto, Calif.

Vegetable growers will be interested in Home and Garden Bulletin No. 23 entitled, *Vegetable Gardeners' Handbook on Insects and Diseases.* Vital information is given on identification and control of the important vegetable insects and diseases and drawings of many of the pests are also included. General tips on insect and disease control are given as well as directions for preparing insecticides and fungicides. You may secure your copy of this valuable bulletin by sending 20 cents to the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

HOW TO CHOOSE

(Continued from page 7)

rigation Guide for the Design of Sprinkler Irrigation Systems." You might ask at your local SCS office to see if they have completed such a booklet for your state.

Ferris Owen grows 100 acres of potatoes on a Chenango silt loam soil near Newark, Ohio. The land is underlaid with gravel and hence has excellent drainage, a requirement for efficient irrigation.

For irrigation water supply, Ferris drilled a 10-inch well 100 feet deep about in the center of his acreage. Putting it here meant a saving in pipe as well as speeding up the efficiency of operation. One man takes care of the irrigation job and often has time for a few odd jobs.

Owen installed a 600-gallon per minute, 10-stage Peerless turbine pump. The turbine is set 70 feet below the top of the well, and the water level is now about 30 feet from the top. Since he started irrigating five years ago, the water level has dropped about six feet in the well.

Uses Electric Power

The 50 horsepower electric motor, operating on three-phase current, has run for five years without a hitch. He feels it is the most economical power if it is possible to put it in. Even though it cost Ferris $2,700 to get the three-phase line to his pumphouse, he feels the cost of operation is less than if he had other sources of power.

From the pump, Owen installed underground 1,000 feet of six-inch transite pipe. This permanent main line extends in two directions from the pump, with connections for the six-inch aluminum lateral lines every 240 feet. Were he to do the job over, Ferris says he would close lateral spacings to 220 feet to give more lap-over and more even water applications.

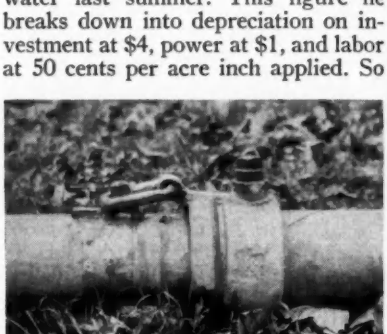
He has 2,300 feet of lateral pipe divided about equal between two lines when irrigating. This permits watering from one line while moving the other, thus making a continuous application. He has six sprinkler stations per lateral and four sprinklers. Only two sprinklers are in use at any one time which permits steady watering.

Each setting of the lateral line will irrigate seven acres, and the system is set up so that laterals are moved three times per day, thus using the minimum of labor. Each Skinner sprinkler has a one-inch aperture and waters a diameter of 320 feet.

Sometimes Ferris irrigates at night rather than during the day, for two reasons. Winds are usually at a minimum during the night, so water can be applied evenly. Night temperatures are lower, hence water evaporation is less and more water soaks into the soil.

Last year, one of the driest of seasons, Ferris applied an inch of water per week for seven weeks. His first application went on about mid-June and the last in mid-August. Very little rainfall occurred during this period and watering meant having a potato crop of 500 bushels to the acre instead of 250 or 300 bushels. He has irrigated every year since installing his system. A very essential instrument in helping to determine when to irrigate is a rain gauge.

Ferris Owen figures it cost him about $5.50 to apply an acre inch of water last summer. This figure he breaks down into depreciation on investment at $4, power at $1, and labor at 50 cents per acre inch applied. So last year it cost Ferris roughly $38.50 to boost his potato yield 100 bushels or more per acre. In a dry year like last season, this means an excellent return on his investment.



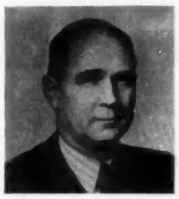
Quick coupling aluminum pipe, made by Chicago Metal Mfg. Co., can be used from five to eight years without repairs. Rubber seal where pipes fit together prevents leaks when water under pressure is turned into pipe.

John Dowler, Ashville, Ohio, grows 20 acres of asparagus, 30 acres of sweet corn, and a few acres of other vegetables. His chief objective is top quality. To help attain this, last year he put all of his 106 acres under irrigation.

Under irrigation, vegetable crops require heavier rates of fertilizer application. Dowler has been fertilizing asparagus with 1,600 pounds of 10-10-10 per acre each year. Now, since he has the acreage all under irrigation, he may have to raise this rate.

He can determine this by checking the soil periodically for its element content and correlating this with the increased yields. Then, too, he can try additional amounts of fertilizer on strips of the field to see what effects they have on yields under irrigation. He also has the possibility of applying fertilizer through the water lines. Dowler's sweet corn fertilizer program, now good, may undergo similar revision in a year or so. THE END

WITH the opening of headquarters of the Vegetable Growers Association of America, Inc., in Washington, D. C., this year, Dr. H. D. Brown of Ohio State University, Columbus, resigned as secretary of the association. In recognition of his long years of service to the VGAA, A. Lee Towson, Jr., VGAA president, has made public a letter which he wrote Dr. Brown on May 4:



H. D. Brown

"The voucher for your last month's salary has just gone across my desk. This officially marks the end of your long and faithful service to the Vegetable Growers Association of America. I am sure that our Association and those in the vegetable industry who belong to our Association have been enriched by the relationships which they have had with you as secretary. Your contributions have been many and valuable and I am sure that none of us has paid our full debt for your services in dollars and 'thank yous.' Your pay, in great part, must have been from the satisfaction in knowing that yours was a task well done."

New VGAA secretary is Joseph S. Shelly, and VGAA headquarters are at 17th Street & Pennsylvania Avenue N. W., Washington, D. C.

STATE NEWS

(*Continued from page 11*)

Coos County Agent Raymond Hall, way up in northern New Hampshire where the seed potatoes are raised, reports that some growers are planning to grow 100 tons of carrots for a Manchester soup company. This is a new proposition in that part of the state, so this experiment will be watched with interest.

Twilight vegetable meeting season is on. A recent meeting in Hudson attracted over 50 growers to get the latest information on chemical weedkillers. Calton Cartwright, Essex (Mass.) County agent gave a very informative talk on weedkillers, showing results of trials conducted in his county. Previous to this year only a few New Hampshire growers used weedkillers but many growers are planning to apply them this year. The dinitro types are most popular.—*Perley D. Colby, Asst. Co. Agr. Agt., Milford.*

INDIANA—Cannery tomato acreage this year is down five per cent over 1953. The 1953 acreage was down 27 per cent.—*F. C. Gaylord, Sec'y, ISVGA, Lafayette.*

MINNESOTA—Growers in the Hollandale area are co-operating with the University of Minnesota in numerous demonstration plots. Chemical weed control with CMU and chloro IPC on onions is being demonstrated on one plot, while fertilizer experiments are being conducted on still other plots. Variety demonstration plots include 14 potato varieties and 56 hybrid strains and varieties of onion.

In other parts of the state test plots include five potato variety plots. Carrot, broccoli, celery, and other variety plots will also be included.

The tour and field day of the Southern Minnesota Vegetable Growers on July 20 will include the demonstration plots at Hollandale.

Lake of the Woods Potato Growers Association is strengthening its potato quarantine in order to maintain their foundation seed industry. This section of northern Minnesota is unique in that only three roads lead in or out of the area. Growers have experienced a good demand for their high quality foundation seed potatoes. At their annual meeting Fred Fillie was elected president, Richard Olson secretary, and the board of directors includes Elmo Sorrels, LeRoy Carlson, and Gilbert Peterson.

Paul Petran continues as president of the Minnesota Vegetable Growers Association, having recently been re-elected.—*O. C. Turnquist, Sec'y, MVGA, St. Paul.*

ILLINOIS—Members of the Illinois Junior Vegetable Growers Chapter are really going to know how and what kind of vegetables to grow. A new monthly garden folder that will tell the junior gardeners just what they want to know about their crops is now being published with the help of Dr. Norman Oebker, extension vegetable crops specialist at University of Illinois, and Jack Armstrong, Springfield.

At the NJVGA convention in Tulsa, Okla., Illinois was well represented in judging contests by Southern University, University of Illinois, Future Farmers of America, Illinois Junior Vegetable Growers Chapter and the 4-H vegetable demonstration and judging teams.

Even grade school children are encouraged to have vegetable gardens, and at Round Lake the Parent Teachers Association has sponsored 275 garden plots for grade school children.—*W. R. Laechelt, Mundelein.*

WASHINGTON—Early potato growers in the Pacific Northwest should have a chance this year to recoup at least some of last year's losses. A smaller crop this year should result in prices averaging $10 or so a ton above last year's average.

Growers may also expect slightly better prices for late potatoes, larger supplies and lower prices for dry peas, and somewhat improved prospects for 1954 onions.

Effective chemical control of weeds depends upon applying the proper amount of chemicals. To gauge the amount of chemical being applied, Dr. Stanford N. Fertig, extension specialist in weed control at Cornell University, suggests replacing one nozzle of the spray boom with a special calibration jar. By driving your tractor a short distance you can read the rate of spray applied per acre from the jar.

Early potato growers can expect prices to fall somewhere within the $30 to $45 per ton range after sorting for U. S. No. 1 Reds, Long Whites, and Russets. Average price will probably be closer to $45.

Washington potato growers expect to plant 27,000 acres, down 1,000 from last year.—*S. Q. Hoobler, Pullman.*

OHIO—A new bulletin containing latest information on greenhouse tomato production including cultural practices and insect control is now available. It is a joint publication of the agricultural extension service, Ohio State University, and Ohio Agricultural Experiment Station. Ohio, with tomatoes as the principal crop, is the leading greenhouse vegetable producing state in the U. S.

Copies of the 62-page illustrated publication are available at 60 cents each from Agricultural Extension Service, Ohio State University, Columbus 10, Ohio. Please do not send stamps. Make checks and money orders payable to Ohio Agricultural Extension Service.—*E. C. Wittmeyer, Ext. Hort., Columbus.*

(*Continued on page 25*)

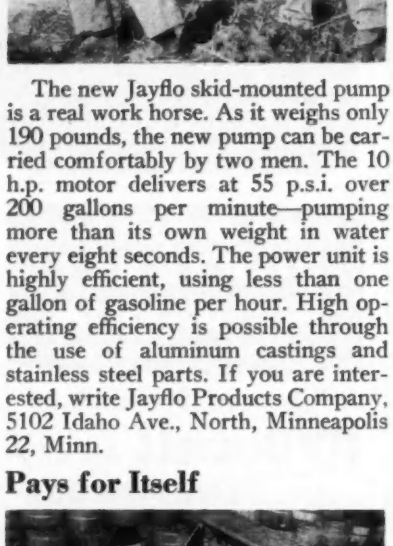
NEW FOR YOU

—to increase your profits

Pumps Its Weight

The new Jayflo skid-mounted pump is a real work horse. As it weighs only 190 pounds, the new pump can be carried comfortably by two men. The 10 h.p. motor delivers at 55 p.s.i. over 200 gallons per minute—pumping more than its own weight in water every eight seconds. The power unit is highly efficient, using less than one gallon of gasoline per hour. High operating efficiency is possible through the use of aluminum castings and stainless steel parts. If you are interested, write Jayflo Products Company, 5102 Idaho Ave., North, Minneapolis 22, Minn.

Pays for Itself

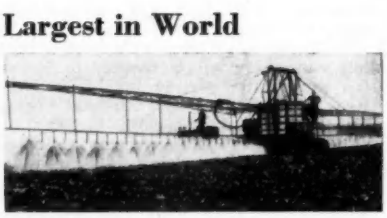


We watched the new Brown dual seed cutter at work recently. The machine is designed for the 25 to 30 acre grower and has a capacity up to 60 bushels per hour using only three men. It will cut any size potato from a two cut to a four cut. The knives are bolted to the machine and do not move. The machine is powered by a one-third h.p. electric motor. A hopper is mounted on the back to receive the cut seed, which is cut to a uniform size and is square to facilitate planting. The semi-automatic feeding elevator is designed to function as a grader, also, bringing the tuber directly into the hands of the operator. Why not write K. G. Brown, Wickham Ave., Mattituck, L. I., N. Y.? He will be delighted to send you full details.

How and Why

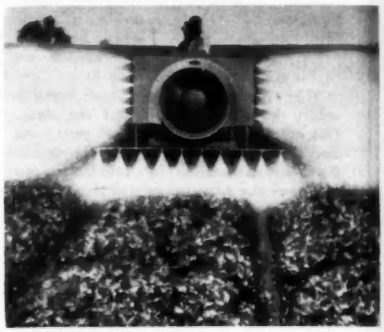
How to select the right electric motor for the irrigation job to be done is often a puzzle. Why a certain type of motor should be used is equally complex. To help you, General Electric has just made available to readers two new irrigation booklets entitled, *How to Select and Apply Electric Equipment for Irrigation Pumping* (GEA-5917B) and *Motors and Control for Irrigation Pumping* (GEC-1023). The first bulletin, GEA-5917B, contains information on selection and application of electric equipment for irrigation pumping, with photos, drawings, and tables outlining the steps. Sections on maintenance, wiring, and operating details are included. The other bulletin, GEC-1023, presents 20 pages of data on various motors and controls used for irrigation. Information on prices, operating characteristics, and dimensions is given. You can get your copies by writing Art Hemker, General Electric Co., Schenectady 5, N. Y.

Largest in World



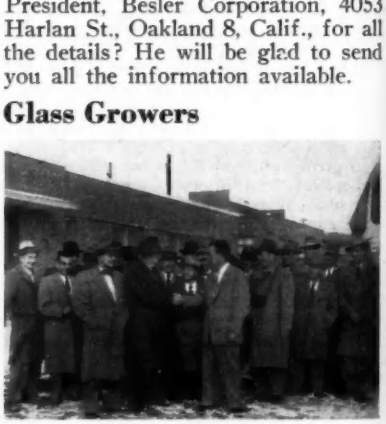
Here is the world's largest spraying rig which is used on leaf vegetables in Florida. The rig has reduced the production cost of sweet corn from $170 per acre to $110. This single machine applies insecticides to 1,500 acres of sweet corn and 400 acres of leaf lettuce. The spraying boom can be raised to a height of nine feet. The pump is powered by a 75 h.p. Diesel engine and the entire rig is propelled by a D-6 Caterpillar tractor. The rig is owned by the Shawano Development Corp., 70 Wall St., New York, N. Y.

Real Coverage



The new Bes. Blo row crop sprayer attachment designed for the vegetable grower looks very good. The machine covers 80 feet at a pass and is easily attached to your present high pressure rig. It provides easy maneuverability and a thorough coverage of wide areas. Bes. Blo is a famous name among fruit growers, and now the company brings the same "know-how" and engineering skill to the vegetable grower. Why not write Tim Colvin, President, Besler Corporation, 4053 Harlan St., Oakland 8, Calif., for all the details? He will be glad to send you all the information available.

Glass Growers



Forty Cleveland, Ohio, greenhouse growers recently got an eyeful when they visited the research and production facilities of the Niagara Chemical Division at Middleport, N. Y. Niagara, believing that you must practice what you preach, has invested many thousands of dollars in vegetable and fruit production acreage where chemicals are being tested and retested. The growers observed screening and testing techniques that are used by Niagara in developing new insecticides, fungicides, and weed killers to be used on vegetables. If you happen to be near Niagara, Frank Chestnut will be delighted to show you around.

OPPORTUNITY ADS

Only 25c a word for one-time insertion; 20c a word for two-time insertion; 15c a word for four-time insertion—CASH WITH ORDER. Count each initial and whole number as one word. ADDRESS AMERICAN VEGETABLE GROWER, Willoughby, Ohio.

FOR SALE—EQUIPMENT AND SUPPLIES

MUSHROOM COMPOST TURNING MACHINE, 3 H.P. motor. Fifteen ton York ammonia ice machine complete with condenser, 15 H.P. motor, valves and equipment. Two row self propelled Holland transplanter. F. LUCE & SON, Perryville Place—P. O. Box 238, Ashtabula, Ohio.

WRITE FOR DESCRIPTIVE LIST OF USED power sprayers, potato and orchard equipment. THE HOLLANDIA GARDENS, S. Vienna, Ohio.

TWO ROW VEGETABLE SEEDER $25. IRVIN DYCK, Winton, California.

VEGETABLE TOPPERS. FOR YOUR RADishes and onion sets. Large toppers for regular topping needs. TOP-ALL MACHINE WORKS, Rockton Road, South Beloit, Ill.

FOR SALE—FARM

EXPANDING FARM MARKET ON U.S. 12 four miles from Ann Arbor. Excellent storage, parking. Two-family brick Colonial home, seventy acres garden soil available. Irrigation stream. HONEYBROOK FARM, 6400 Jackson Road, Ann Arbor, Michigan.

MEDICAL

FREE BOOK—PILES, FISTULA, COLONstomach, associated conditions. Newest scientific procedures. THORNTON & MINOR HOSPITAL. Suite C-612, Kansas City 9, Mo.

MISCELLANEOUS

"BEESTROY" GETS RID OF WILD HONEY bees in dwelling houses. 1 colony size $2.00 or 3 for $5.00 postpaid. VALLEY APIARIES, Prophetstown, Ill.

VEGETABLE PLANTS

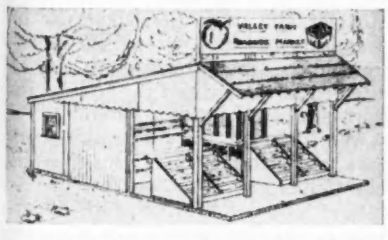
SWEET POTATO PLANTS, DELICIOUS IMproved portoricos. Postpaid, 200—$1.25; 500—$2.25; 1000—$4.00; 2000—$7.50. SMITH PLANT FARMS, Gleason, Tenn.

SWEET POTATO PLANTS, 1000 OR 100,000. ROBERT SIMMONS, Sharon, Tenn.

WANTED TO BUY

WANTED: GOOD USED MECHANICAL CARrot harvester. BOX 102, AMERICAN VEGETABLE GROWER.

This roadside market, conveniently located so the motorist can readily stop, will make it easy for you to take care of customers quickly. Movable racks make it possible to maintain an



attractive stand in accordance with supply and demand, and the overhanging roof affords protection for the customer. Working drawings for this easy-to-build stand are available for 50 cents from AMERICAN VEGETABLE GROWER, Willoughby, Ohio.

STATE NEWS

(Continued from page 23)

WISCONSIN—Potato growers in Wisconsin intend to plant around 15 per cent fewer acres this coming season than in 1953, which means about 53,000 acres of potatoes. This is a year when the wise grower will select his best acres to plant.

Here are 11 ways a potato grower can increase his efficiency:

1) Select the most fertile potato fields on your farm. Supply these fields with organic matter or grow a green manure crop and plow it under.

2) Choose a variety that does well in your area and on your soil and is well suited to consumer demands. This is the time to try some Russet Burbanks, provided you have the right soil, irrigation, and considerable experience with potatoes.

Iowa State Vegetable Growers Association recently presented each of the 86 Indian families on the Tama, Iowa, reservation with 50 pounds of Cherokee seed potatoes. Photo shows Mrs. George Young Bear, wife of assistant chief of tribe, holding some Cherokees on her lap. The Cherokee variety, suitable for muck and light loam soils, is an outstanding success of the breeding program as it does not scab, seems immune to hollowheart, and is blight resistant.

3) Plant only certified or otherwise clean productive seed stock.

4) Have potato soils tested. Fertilize according to recommendations for growing 500 bushels or more per acre.

5) Use careful seed handling practices to insure uniform plant stands. If you have experienced excessive seed decay in past seasons try one of the newer seed treatment materials. Thiram, Orthocide, or a similar material is good insurance against replanting or putting up with a ragged stand.

6) Plant in a deep, loose, well-prepared seedbed.

7) Be prepared to irrigate should your situation demand it. Moisture measuring devices such as the "tensiometer" would be a good investment, particularly for the Russet Burbank grower.

8) Control weeds with frequent, shallow, early cultivations, or use recommended chemicals on muck soils.

9) Do an efficient job in combating insects and diseases. Sound sanitation procedures for bins, machinery, and seed containers are part of the program.

10) Preserve crop quality once you have produced it.

11) Make plans for merchandising this year's potato crop. Washing, careful grading, attractive packaging, and proper labeling are key factors.—*John A. Schoenemann, Ext. Spec. Veg. Crops, U. of Wis., Madison.*

Mechanical Genius

ONE characteristic — ingenuity — stands out prominently in the successful vegetable grower. One of our editors recently visited a number of vegetable growers in different states and among numerous questions, he asked them about mechanical or laborsaving devices that they themselves have perfected. It is heartening to find such a wide variety of mechanical skills at work on our farms.

Some growers pointed to the fact that there is hardly a piece of equipment purchased that does not undergo some changes to make it fit a particular job on a particular farm. Some changes are minor, like increasing the size of wheels and tires, or changing the method of hitching the tool to the tractor, or making hydraulic lifts out of hand-lift tools. Others are major changes. A grower may purchase parts of a given type of implement from different manufacturers, then assemble the tool in the farm shop in such a way that it is tailored to fit the needs of his farm. In a few cases, entire pieces of equipment have been built in the farm shops.

When we look around and see this sort of planning going on, not just occasionally but every day on every successful vegetable farm, we feel greatly encouraged. We believe that some of this country's best brains are right out there working on these farms. This is a highly competitive age, and one must develop a certain amount of mechanical skill in order to stay in business. We are encouraged to see it among our growers.

New Ideas About Irrigation

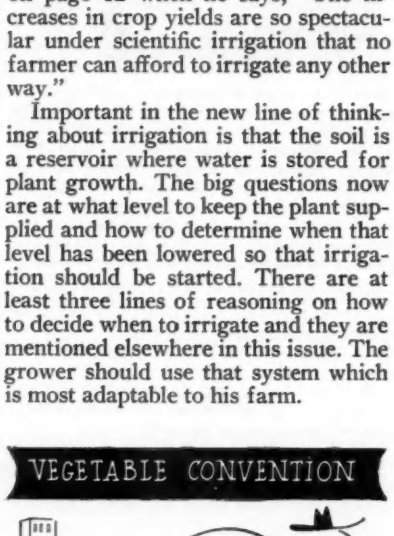
THE title of Arthur Pratt's article, "Irrigate to Make—Not Just to Save —Your Crop," on page 10 gives some idea of the new way in which irrigation is regarded by our foremost crop scientists. More and more, evidence being uncovered shows that maintaining an adequate moisture level up to 50 per cent soil capacity consistently throughout the growing season will markedly affect yields.

It wasn't so long ago that competent research workers believed that the plant could keep itself supplied with adequate moisture so long as the supply in the soil was above the permanent wilting point, the level at which there is no water available in the root zone. This line of reasoning led to the idea that in humid areas irrigation was a disaster-averting proposition, for use only during times of serious drought.

It has recently been proved, however, that the level of moisture is important to yields. Since the crop uses moisture at a steady rate which can be easily determined and rainfall, as everyone knows, is as fickle as the wind, it stands to reason that some means other than Mother Nature is necessary to insure a constant soil moisture supply at a predetermined level. We are beginning to realize that moisture supply is just as necessary and important as frequent cultivation, fertilization, or planting good seed.

Dr. C. W. Thornthwaite of the Laboratory of Climatology of Johns Hopkins University puts the gist of the above point of view in his article on page 12 when he says, "The increases in crop yields are so spectacular under scientific irrigation that no farmer can afford to irrigate any other way."

Important in the new line of thinking about irrigation is that the soil is a reservoir where water is stored for plant growth. The big questions now are at what level to keep the plant supplied and how to determine when that level has been lowered so that irrigation should be started. There are at least three lines of reasoning on how to decide when to irrigate and they are mentioned elsewhere in this issue. The grower should use that system which is most adaptable to his farm.



"Potatoes, Potatoes! All our Congressmen talk about is potatoes!"

Directory Issue

YOU won't want to be without next month's issue of AMERICAN VEGETABLE GROWER. It will contain a complete and scientifically indexed directory of names and addresses of suppliers and manufacturers, from seed houses to hoes and from dusters to precision planting equipment.

Vegetable farming is becoming increasingly mechanized, and the Directory or Buyer's Guide number will be handy to keep in your desk drawer for ready reference. The complete listings of all the suppliers will help you with those last-minute repairs.

The only way to be sure that you are making an intelligent and wise purchase is to learn all about the different makes and models of equipment in which you are interested.

Keeping well informed is in itself a tough job. You will find that the new Buyer's Guide number of AMERICAN VEGETABLE GROWER will take a load off your shoulders with its convenient index and listings.

Chemicals and the Soil

IN this day when new and more potent chemicals are being used to rid our fields of insects and diseases, we often wonder just what the ultimate effect will be upon our soils and crops.

Since spraying and dusting are now continuous practices on most of our vegetable farms, it is possible that after a time, troubles will develop. Heavier and more persistent use of chemicals may lead to toxic accumulations in the soil. Plant growth may be affected adversely and the soil microflora destroyed to some extent.

We know of some research work that has been done along this line and our thinking is not altogether merely fancy. Now we hear of work underway at the University of California which proposes to answer many of these questions about chemicals and their effects, singular and accumulative. Work has been underway only a short time and it indicates adverse effects of some chemicals upon germination of seeds and upon plant growth.

This is a long range project and it is too early to draw any conclusions. As soon as significant results are found we shall report them. In the meantime, we should consider following the practice of using a minimum rather than a maximum dosage.

How much do you know about MALATHION*

(Cyanamid's new organic phosphate insecticide)

Did you know...

That malathion is one of the most widely effective of *all* insecticides?

That malathion is the *only* organic phosphate insecticide offering you a wide margin of safety in handling? (Called "one of the safest insecticides to handle" by USDA.)

That malathion is compatible with most other spray materials?

That malathion residues on crops disappear quickly? (Generally less than 1.0 part per million ten days after last application.)

That growers who have used malathion on many different fruit and vegetable crops report outstanding success with malathion against aphids, mites, leafhoppers, Mexican bean beetle and a host of other insect pests?

That malathion also kills flies, even strains which have developed resistance to other insecticides?

Want to know more?...

Write today for MALATHION GROWER'S GUIDE.

Consult your local agricultural authorities for suggestions on dosages and application procedures. Malathion insecticides are available from well-known manufacturers.

*Also known as MALATHION

Malathion preferred for control of pea aphid

An Eastern agricultural station reports that malathion is the preferred insecticide for use against the pea aphid. Advantages: equal or superior effectiveness, residues do not persist, less hazardous than other organic phosphates, long period of protection, one application often sufficient.

RUFFEC

The Asgrow strain of this Fall endive makes large plants, well cut and curled, tufty and compact at center, so that they blanch naturally for crisp salad

Asgrow

ASSOCIATED SEED GROWERS, INC.

Breeders and growers of vegetable seeds since 1856

Atlanta 2 • Cambridge, N. Y. • Indianapolis 25 • Oxnard, Calif. • Exmore, Va.
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